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### paper text:

Recalling the sonic perception of visually impaired people of Surabaya's urban parks Christina E. Mediastika<sup>1</sup>, Anugrah S. Sudarsono<sup>2</sup>, Luciana Kristanto<sup>1</sup>, Gunawan Tanuwidjaja<sup>1</sup>, Rony G. Sunaryo<sup>1</sup>, Rully Damayanti<sup>1</sup> <sup>1</sup>Department of Architecture, Petra Christian University, Surabaya, Indonesia <sup>2</sup>Department of Physics Engineering, Institut Teknologi Bandung, Indonesia

**Abstract.** Urban parks in a developing country hardly accommodate people with disability. The objective of this study is to investigate the possibility of improving urban parks using the perception of visually impaired people of urban parks' sonic environment. This study was conducted off-site the urban park using a questionnaire survey with two groups of participants: sighted people (35 participants) and visually impaired people (35 participants). The analysis was conducted using semantic analysis from the word used for explaining the sonic environment. This study shows that the visually impaired participants explained the sonic environment with more terminologies (56 terminologies for visually impaired participants and 32 terminologies for sighted participants). It indicates the engagement with the sonic environment is higher for the visually impaired participants compared to the sighted participants. In general, the visually impaired participant perception of urban parks represents similar terminology, but with more perception compared to the sighted participants i.e., safety, directivity, and space. The later stage is to use the on-site method to validate and enrich this finding to arrive at design proposition for the improvement of urban parks.

**Keywords:** soundscape, visually impaired people, urban park

**1 Introduction** An urban park is ideally a place with a relaxing atmosphere surrounded by fresh air and calming environment. It is a place where urban communities may escape from the stressful urban activities, a place where the natural soundscape is present. A study showed that people like to hear the natural soundscape as it comforts and calms heart and mind [1]. In Indonesia, the urban population rapidly grows and results in the excessive development of buildings and infrastructures to accommodate the population needs. For mobility, Indonesians are now assisted by the ease of ownership of motorized vehicles, which increases the number of motorized vehicles significantly. It directly triggers more noise in the surrounding area. In the end, it creates a completely different urban soundscape compared to that of the earlier decades [2]. The rapid turnover causes significant degradation of the built environment [3, 4, 5]. A soundscape is a surrounding sound experienced by a person in a particular location. In the early decades, the soundscape was a hi-fi (high fidelity) soundscape [2]. It is when the background sounds around us is at a low-pressure level so that people easily hear and identify the type of sounds around them. In the past, natural soundscape was dominant. Nowadays, the urban soundscape has dramatically changed to lo-fi (low fidelity) [2]. In the lo-fi soundscape, the masking of sound is very strong caused by quite a loud background noise. In the lo-fi

soundscape, people are difficult to recognize sounds, particularly when machinery sounds are dominant. According to Dubois et al. [6], people can tolerate the noise of human activities compared to machinery noise. The unrecognizable urban soundscape caused by machinery sounds may create an uncomfortable and unsafe environment for people. Visually impaired people may be positioned as the most vulnerable here, due to the inability to see the surrounding. The lo-fi soundscape causes visually impaired people difficult to identify the surrounding. This condition also happens in public areas such as urban parks. Surabaya is a second metropolitan city in Indonesia with better quality and more percentage of urban parks compared to other cities in Indonesia. Surabaya's urban parks have become a role model for other Indonesia cities. The rapid development of urban parks in Surabaya started approximately the last ten years when the current mayor was the head of Cleanliness and Landscape Office of Surabaya. From only one to three parks, now it is more than 30 active urban parks in Surabaya. The rigorous development of urban parks in Surabaya is highly appreciated by the communities. Nonetheless, with so many parks, the ideal condition of urban parks in Surabaya has not been fully perceived. Most urban parks in Surabaya are located adjacent to major streets condensed with motorized vehicles with the potentiality of traffic noise dispersion to the park area. It creates a lo-fi soundscape in the parks to cause difficulties to enjoy natural sounds. Fig 1. Bird's eye view of Taman Persahabatan (Friendship Garden) within a roundabout and with insufficient access. Fig 2. City map of three urban parks in Surabaya namely Taman Persahabatan (Friendship Garden), Taman Lansia (Senior Garden) and Taman Pelangi (Rainbow Garden) that are within roundabouts of major streets with inappropriate access. Sighted people commonly identify and enjoy the surrounding visually. It includes the way how sighted people enjoy the urban parks. We mostly slide aside the need for a community with a visual disability who use hearing sense to identify, locate and enjoy the environment. Apart from the audio features that are barely experienced by the urban park visitors, safe and comfortable access to the parks are also an issue of most Surabaya urban parks. There are parks where safe access is unavailable, especially for those with disabilities. Taman Pelangi Surabaya, for example, is within a roundabout. There is no bridge nor underground pathway for pedestrians to access the park. Even a city park designed specifically for the elderly, namely Taman Lansia is also within a roundabout where there is no safe access for people to go into (Fig 1 and Fig 2). The use of the soundscape of the visually impaired is interesting since there was soundscape research, but none of them had particularly examined the soundscape of visually impaired people, not even to utilize visually impaired person's capability in soundscaping. Meanwhile, the earlier study explained that visually impaired people hearing sense is more sensitive than the sighted people [7]. Several related soundscape studies were by Dubois [6], Botteldooren [8], De Coensel [9], Evensen [10], Lynch [11], Miller [12], Nilsson [13], Raimbult and Dubois [14]. Concerning the condition of most of Surabaya's urban parks that are still not ideal for all city communities, a project was programmed to invite visually impaired people to participate in soundscape surveys both off-site and on-site. At the first stage reported in this paper, an off-site survey was conducted. This method was aimed at recalling the sonic perception of the participants about urban parks or simply parks that they have visited. This stage is significant to underlie participants' understanding of parks. Meanwhile, the whole project is aimed to map the soundscape of city parks perceived by visually impaired people in particular to improve the condition and the facilities of parks at the later. Using the off- site and on-site survey approach, by the end of the project, a recommendation for more habitable urban parks for both sighted and visually impaired communities is expected to borne-out.

## 2 Methods

At the very first stage, the aim of the project was to collect people's memories of an urban park without necessarily being on-site. This stage was conducted using both qualitative and quantitative methods. The qualitative was employed earlier using a focused group discussion of two sighted persons and two visually impaired persons (Fig. 3). The finding of the focused group discussion was then used as a reference to develop questionnaires for the later quantitative stage. The questionnaire was developed simply in the structure for the ease of the visually impaired to elaborate the question before answering. The visually impaired participants answered the questionnaire assisted by

sighted participants who were also respondents in this project (Fig. 4). Thus, there were two groups of respondents, i.e., a group of sighted and a group of visually impaired people which consists of 35 persons each. There were 70 respondents in total. All participants were between 14 to 22 years old. Fig 3. The first stage of the project was a focused group discussion. Fig 4. The visually impaired participants were assisted by the sighted participants to describe their perception of urban parks' sonic environment off-site. 3 Findings At the first stage, a focused group discussion was carried out to collect the general perception of urban parks among participants consisted of two visually impaired persons and two sighted persons (Fig 3). The focused discussion was led by a question of what came across the participants' mind when people talk about urban parks. They may describe the park in a word or a sentence or even a paragraph. Both type of participants also expressed the reason for visiting parks or gardens in the city because it is free entry. They also have a linked activity prior to or after visiting a park, i.e., shopping either for food or other daily needs. From the focused group discussion, some terminologies were borne-out. At this stage, the visually impaired described both "visual" and sonic environment of urban parks with more terminologies than the sighted ones. The findings from the focused group discussion were to be strengthened by the questionnaire stage. At the quantitative stage, the data collected from questionnaires were elaborated using word clouds (Fig. 5 and Fig. 6). Word clouds program was selected due to the capability to identify trends and patterns that would otherwise be unclear or difficult to see in a tabular format. By the word clouds, we learn that visually impaired participants described the urban parks' soundscape with more terminologies compared to the sighted ones (Fig. 5 and Fig. 6). The visually impaired participants explained the sonic environment with 56 terminologies. Meanwhile, the sighted respondents explained it with 32 terminologies. It indicates the engagement with the sonic environment is higher for the visually impaired participants compared to the sighted participants. More interestingly, there were terminologies of the visually impaired relates to safety, directivity, and space, which were not borne- out from the sighted participants. The terminologies that relate to safety are confused, afraid, dangerous, safe, and worry (5 terminologies). The terminologies that relate to directivity were the position, important, near, directed, and confused (5 terminologies). The terminologies that relate to space were oversized, opened, wide, too small, big, full, and few (7 terminologies). The terminology "confused" may be plotted to the sonic environment of both safety and directivity. Interestingly, there was also terminology of "contaminated" which seems to not belong to either safety, directivity, or space. The nearly equal ratio of terminologies (5:5:7) of safety, space and directivity indicate that for the visually impaired participants, the aspects of safety, space, and directivity in an urban park are equally important. With the safety, space, and directivity aspects are 1/3 of the total terminologies perceived by the visually impaired participants, we ideally consider these aspects while improving urban park facilities. Fig. 5. The terminologies of sonic environment of urban parks by the visually impaired participants in Bahasa Indonesia (left) and in English (right). Fig. 6. The terminologies of sonic environment of urban parks by the sighted participants in Bahasa Indonesia (left) and in English (right). 4 Conclusion and recommendation The initial study of the soundscape of visually impaired people showed that visually impaired persons perceived the sonic environment more detail than the sighted persons. They perceived sound surround them as a guide to their activities. It indicates and strengthens the finding of the earlier research that sighted people perceived their surroundings more visually rather than auditory [15, 16]. It is an indication that safety, space, and directivity are all similarly significant aspects of an urban park for the visually impaired to identify, explore and enjoy the park. An on-site survey is planned at a later stage to confirm the findings of the off-site survey. It is expected that the study can draw a large picture composed from the already possessed

perception of an urban park soundscape and the current soundscape of the

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current Surabaya's urban parks. It will provide more comprehensive data in order providing detailed design

recommendation to improve urban parks. The later stage will be reported in other papers. The research team

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